URBAN SYSTEMIC PROGRAM IN SCIENCE, MATHEMATICS, AND TECHNOLOGY EDUCATION

A Foundation for K-12 Science and Mathematics Educational System Reform

Program Announcement NSF 99-52

DIVISION OF EDUCATIONAL SYSTEM REFORM

DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES

PROPOSAL RECEIPT DEADLINE: MARCH 31 ANNUALLY

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TABLE OF CONTENTS

INTRODUCTION **1**

OVERVIEW **1**

PROGRAM DESCRIPTION **2**

ELIGIBILITY REQUIREMENTS **3**

AWARD INFORMATION **4**

PROPOSAL PREPARATION AND SUBMISSION INFORMATION **4**

PROPOSAL REVIEW INFORMATION **8**

AWARD ADMINISTRATION INFORMATION **10**

CONTACTS FOR ADDITIONAL INFORMATION **11**

OTHER PROGRAMS OF INTEREST **11**

APPENDIX

A—Baseline Data

INTRODUCTION

Science and technology are bringing about dramatic changes in American society. In an increasingly technology-oriented society, a basic understanding of science and mathematics is essential to maintain a population prepared to meet the need for a technically competent workforce and to exercise the responsibilities of citizenship in a modern democracy. Emerging jobs require higher skill levels in science, mathematics, engineering and technology (SMET) education than ever before, and more effective education and human resources initiatives are necessary if America is to maintain its technological leadership in the world marketplace.

The National Science Foundation (NSF) is committed to providing strong and continuing leadership and support for the nation's efforts to improve SMET education and general scientific and mathematical literacy. Consequently, the Foundation supports programs that are designed to improve the quality of SMET education at all levels.

The Directorate for Education and Human Resources (EHR) has primary responsibility for NSF's educational activities. The programs supported by EHR span preschool through professional levels. Programs include student-centered activities, curriculum and instructional materials development, informal science education, teacher and faculty enhancement, and comprehensive systemic improvement efforts at the precollege and undergraduate levels. Activities range from programs to improve public science literacy to those designed to enhance the diversity and the preparation of the Nation's scientists, mathematicians, and engineers.

Within EHR, the Division of Educational System reform (ESR) serves as a focal point for the Directorate's systemic reform efforts by managing large-scale programs designed to strengthen the science, mathematics and technology education infrastructure of states, urban centers, and rural areas. The programmatic activities of ESR have focused on stimulating states, rural areas, and selected major cities to initiate comprehensive efforts for making lasting improvements in their science, mathematics, and technology education. These programs, first established in 1991, challenge the nation's commitment to effect sustained school reform in the aforementioned three sectors.

Systemic reform of education is increasingly recognized as a necessary strategy to provide sustainable improvements in the nation's educational enterprise. *Systemic* refers to fundamental, comprehensive and coordinated changes in science, mathematics, and technology education through attendant changes in policy, financing, governance, management, content, and conduct. *Systemic reform* occurs when all essential features of schools and school systems are engaged and operating in concert; when policy is aligned with a clear set of goals and standards; when the forthcoming improvements and innovations become intrinsic parts of the ongoing educational system for all children; and when the changes become part of the school system's operating budget.

This solicitation describes a key component of the ESR's effort, the Urban Systemic Program (USP) in Science, Mathematics, and Technology Education. It derives from the merger of two existing efforts, the Urban Systemic Initiative Program (USI) and the Comprehensive Partnerships for Science and Mathematics Achievement (CPMSA). Through this combined effort, NSF seeks to stimulate interest, increase participation, improve achievement, and accelerate career advancement and success of all students of the participating urban school districts.

OVERVIEW

The USP is a **K-12-based program** that promotes systemic reform of science and mathematics education for all students. To provide further assurance that significant improvement will occur district-wide—at the K-12 level, the USP program includes programmatic options that seek to foster partnerships between urban school districts and two-and four-year colleges and universities. The USP was developed to extend support to urban school districts that have an established infrastructure for change and have begun implementation of systemic reform. The intent is to enable these urban school districts to continue to foster experimentation, accelerate the rate of change, and increase implementation of system-wide improvement in student learning for grades K- 12 in mathematics, science, and technology. The intent is to also offer to these urban school districts, the opportunity to partner with local two-year and four-year institutions to produce an educational system for the production and maintenance of a high quality science and mathematics instructional and technological workforce. The expectation is that some of these urban school districts, in partnering with institutions of higher education, will also collaborate in research on practice in science, mathematics, and technology and actively seek to employ graduate students and post doctoral personnel in improving K-12 science and mathematics instruction.

The importance of the USP is made manifest by the fact that urban school systems enroll more than half of all public school students in the United States. Although some progress is being made, there is a continued disparity between the academic performance of these students in both science and mathematics and that of their counterparts in suburban schools. This disparity has been linked to a number of factors including uneven allocation of resources, lack of highly qualified and experienced teachers, low enrollment in advanced courses, inadequate curriculum materials, the lack of equipment and poor facilities, and few role models. NSF is uniquely positioned to leverage its existing program base to implement the placement of SMET graduate, upper-level undergraduate students, and post doctoral personnel in K-12 classrooms to assist teachers with the content components of inquiry-centered science and mathematics teaching. Such an effort will increase the likelihood that graduate and undergraduate students in SMET disciplines will elect to become future faculty and K-12 teachers of science and mathematics. This program affords the opportunity to build on NSF's existing connections to both the research and education communities and on its years of experience with the USI initiative and CPMSA program to achieve sustained improvements in the quality of sci-

ence and mathematics teaching and learning in K-12 urban school districts.

In the years in which EHR offered the USI initiative and CPMSA program, a number of key findings emerged as important to the successful implementation of systemic reform. Premier among key findings was that a high-quality mathematics and science program, inclusive of the curriculum, instruction, and assessment, was essential to obtain improved performance by all students. Accordingly, the USI initiative and CPMSA program have: (1) fostered systemic thinking and outcomes; (2) required sustained and accomplished management of the forces, funding streams, and conflicts that impact on improving student achievement; (3) improved significantly the use of state and local standards to guide the implementation of a high-quality science and mathematics program for all students; (4) encouraged the establishment of policies in support of K-12 science and mathematics; (5) leveraged and/or converged resources that greatly exceeded NSF financial support; (6) expanded the role of partners in reforming science and mathematics education; (7) validated the need for both the NSF oversight and site-based accountability processes as essential to reform progress; (8) identified the school as the most probable unit of change; and (9) increased student participation, performance and achievement across all sites—at all levels tested—in mathematics and in science.

Moreover, it became evident that a five-year implementation period is insufficient time to occasion comprehensive reform; that an exceedingly small pool of expertise is resident in the funded sites or the larger mathematics and science education community. It also became evident that the implementation of a systemic initiative required the building of solid leadership and expertise at all levels and that the principal was shown to be a necessary leader in order to promote and sustain reform efforts over time. Furthermore, it became increasingly clear that success in reform required extensive use of data to identify and define areas within the system in need of immediate redesign and restructuring. Also prominent among the key findings was the critical need for the reform process to be informed by research conducted on classroom practice.

Informed by the aforementioned key findings, the **goals** of the USP program are:

(1) to improve the urban school district's implementation of a standards-based, inquiry-centered science, mathematics, and technology education for all students K-12;

(2) to increase the competency and diversity of the science and mathematics instructional workforce;

(3) to promote collaborations with colleges and universities having teacher preparation programs to improve their approach to teacher education;

(4) to increase the number of skilled entrants to the technology-based workforce; and

(5) to employ research as an effective tool in improving the teaching and learning of science and mathematics.

PROGRAM DESCRIPTION

A. K-12 Base Program

Districts that elect to participate in this program should carefully review the description for the **K-12** base program and, if desired, one of the options listed below in developing their program design. The Foundation intends to allow maximum flexibility in the design of efforts to address the K-12 science and mathematics educational continuum, as long as the goals and objectives of the Urban Systemic Program are achieved. Differences in the structure and content of proposed programs will be governed by the differences in institutional and organizational capabilities of the urban areas and by the needs specific to the target groups.

Submitting urban school districts must demonstrate how the system's plan will lead to full-scale implementation of a K-12 standards-based science and mathematics operation—systemwide, inclusive of the curriculum, instruction and instructional materials, assessment, and professional development. Districts should also provide evidence for the use of district-wide profiles or strategies to determine the degree to which standards-based science and mathematics curriculum is being implemented, including a mechanism for evaluating the system's science and mathematics education infrastructure, instructional workforce needs, and the instructional workforce's competency and capacity to deliver the curriculum. The district should provide pertinent information regarding the use of an established district-wide accountability plan that relies heavily on an array of assessment measures to document student progress, including baseline data on science and mathematics student achievement. The district must clearly state all polices in support of a high quality SMET education for all students and identify strategies to ensure that policies are implemented. They must show evidence of the convergence of resources in support of a unitary program for science and mathematics education. In addition, there must be a leadership plan for assisting principals in their roles as educational leaders and a well-developed teacher and student support system. Moreover, it is expected there be ongoing and effective strategies for community engagement, outreach, and parent involvement, as well as evidence of an established or emerging plan for developing effective partnerships in support of standards-based science and mathematics teaching and learning.

The K-12 reform program may include a component that affords opportunities for graduate students and post-doctoral personnel in science, mathematics, engineering, and technology disciplines to assist in expanding K-12 teachers' understanding and depth of content knowledge of fundamental principles of science and mathematics.

B. Program Options

Eligible urban districts must meet the **K-12 based program criteria** and may in addition: (1) establish a collaborative venture with two-year colleges to promote exemplary improvement in technical education; or (2) elect to establish an intersectoral col-

laboration with four-year colleges and universities to improve existing teacher preparation programs that reflect a more standards-based mode of teaching and learning.

Therefore, proposals may include activities that involve two-year colleges in improving technical education via the implementation of new curricula, courses, laboratories, instructional materials, opportunities for faculty and teacher development, academic support for students, and formal cooperative arrangements among educational institutions and partners from business, industry, and government sectors. With the growing need for entrants in technological fields, two-year institutions are expected to support a broad range of technical activities such as: biotechnology, chemical technology, computer and information technology, electronics, environmental technology, geographic information systems, manufacturing, and telecommunications. These programs should be designed to meet local and diverse technological workforce needs while being cognizant of the technical skills needed for global competitiveness.

Correspondingly, proposals may include activities through which four-year colleges and universities representatives agree to work cooperatively and collaboratively to revise and develop strategies that in the short term address localized shortages of a highly trained and diverse science and mathematics teacher cadre. It would be desirable that such collaborations afford research experiences for K-12 students in science and mathematics. The involvement of graduate students and post-doctoral personnel in a research experience for K-12 students would provide enhanced understanding of SMET activities through research. Moreover, revisions and strategies should impact all aspects of teacher preparation from course offerings to at least a two-year teacher induction program. The local K-12 system should use district profiles, student achievement data, curriculum/instructional materials, and other critical elements to assist institutions of higher education with teacher preparation programs in a collaborative effort to ensure that new teachers are prepared to deliver a high-quality science and mathematics curriculum for all students. Colleges and universities will also be expected to develop programs that address the lack of desired depth of content knowledge in the existing instructional workforce, and to encourage a greater number of high school students to select the teaching of science and mathematics as an career option.

Moreover, under the rubric of the urban systemic program, support for **Research on Practice** may be embedded in the K-12 plan. The intent is to involve urban school district and college and university-based personnel in designing research activities to increase the knowledge base on educational system reform, thus contributing to the assessment of urban systemic programming outputs and outcomes. **Possible areas** of research include: (1) promoting comprehensive restructuring in a system that is highly resistant to unitary approaches; (2) transitioning to a system that emphasizes both science and mathematics in the context of the total learning system; (3) practices informing local reform theory; (4) optimizing environments in which all students learn; (5) reallocating teaching resources to improve student achievement; (6) assessing the system and workforce capacity to implement a standards-based science and mathematics education for all students; (7) developing effective K-12/ higher education partnerships in support of K-12 system reform; (8) managing multiple funding entities in support of a standards-based unitary program for science and mathematics education; (9) developing effective instruments for measuring the degree to which reform efforts are integrated into classroom practice; (10) studying replicable units of change (demonstrable nodes of success) for scale up and leading to full institutionalization of reform efforts; (11) identifying factors that influence the development of a dynamic infrastructure for change; (12) establishing credible evidence for documenting student performance without attributional ambiguity; and (13) some combination of the aforementioned issues bearing on systemic reform.

Examples of researchable topics include: comparative utility of practices that led to sustainability of the reform efforts; the effectiveness of strategies for performance-based accountability structures for the acceleration of reform; the efficacy and implementation chronology of balanced mathematics and science content, pedagogical techniques, assessment, and learning technologies to integrate standards-based education and promote reform; an examination of the major elements in systemic reform that require better theoretical specification, including testable hypotheses, alternative implementation designs; and the comparative effectiveness of scale-up strategies of reform in urban school districts.

ELIGIBILITY REQUIREMENTS

There are two categories of eligibility for the Urban Systemic Program: **size of the urban school district** and the **status of current reform efforts**. Proposals must meet the requirements in both categories, as discussed below:

Size of Urban School District: Proposals must be submitted by school districts located within urbanized areas, as determined by the 1996 data from the U. S. Department of Education's National Center for Education Statistics, enrolling at least **25,000 students**. A consortium of eligible urban school districts (of 25,000 each) may apply if deemed useful and appropriate.

Status of Current Reform Efforts: NSF considers successful systemic reform to result in full implementation of the six critical developments identified by the Foundation through it systemic initiative (SI) programs. Submitting school districts should use these critical developments to **determine the status** of their current reform efforts. The six critical developments include:

(1) Implementation of a comprehensive, standards-based curriculum and/or instructional materials that are aligned with instruction and assessment available to every student served by the system and its partners.

(2) Development of a coherent, consistent set of policies that supports provisions of broad-based reform of mathematics and science at the K-12 level.

(3) Convergence of all resources that are designed for or that reasonably could be used to support science and mathemat-

ics education—fiscal, intellectual, materials—both in formal and informal education settings—into a focused program that upgrades and continually improves the educational program in science and mathematics for all students.

(4) Broad-based support from parents, policymakers, institutions of higher education, business and industry, foundations, and other segments of the community for the goals and collective value of the program that is based on an understanding of the ideas behind the program and knowledge of its strengths and weaknesses.

(5) Accumulation of broad and deep array of evidence that the program is enhancing student achievement through a set of indices (e.g., achievement test scores, higher level courses passed, advanced placement tests taken, college admission rates, college majors, portfolio assessment, research experiences, ratings from summer employers). In the specific instance of student achievements test scores, awardees shall report, on an annual basis, the results of student math and science achievements in a multi-grade level context for the SI impacted schools/districts/state(s) relative to appropriate cohort entities (non-SI districts, the state), all of which are defined by the performance baseline. And,

(6) Improvement in the achievement of all students, including those historically underserved, as evidenced by progressive increments in student performance characterized by the requisite specificity of the SI as a catalytic resource and the appropriateness of attendant attributions.

Thus, submitting urban school districts must provide compelling evidence that clearly demonstrates that, to a significant degree, an infrastructure for reform is in place and that the implementation of a standards-based curriculum in science and mathematics **is underway district-wide** at the school system level.

While there is no renewal mechanism for extant awards under the USI program, school districts are eligible to make application to the USP program. Such an application may be submitted at the annual application deadline during the fifth year of the extant USI award. These applications must include explicit and comprehensive documentation that the USI is nearing the completion of full implementation of a unitary system as per the six critical developments that drive systemic reform.

The current CPMSAs are also eligible to make application to the USP program; school districts holding awards may make application to USP during the last year of their current funding period. Documented progress and accomplishments under the CPMSA award are required.

AWARD INFORMATION

Under this announcement, NSF solicits proposals from urban school districts for up to five years depending on the quality of submissions and the availability of funds. The announcement of USP awards will normally be made in writing by the Foundation within six months following the date of receipt of proposals. Awards will be administered through a cooperative agreement following a 12-or-18-month funding cycle. The cooperative agreement under the USP will be based on the extent and scope of activities and the stage of development represented.

The funding for a K-12 systemic reform implementation award may vary from $400,000 to $3,000,000 per year as determined by specified activities supported by the proposal and the size of the school district. These awards will include a one-year phase-in period, funded at a level significantly below that of subsequent years. Funding may increase over time based on documented evidence of achievement per ESR expectations as noted in the program's goals and in the description of the K-12 based program as outlined on Page 2.

Type of award anticipated: Cooperative Agreement

Number of awards anticipated in FY 1999: 10-12

Amount of funds available: Approximately $20,000,000

Anticipated date of award: August/September 1999

REMINDER: Submitting districts must develop a base K-12 program that serves as the core component upon which the K-14 or K-16 options are designed.

Future year support will be contingent upon the availability of funding and acceptable progress in meeting program objectives as determined by monitoring and evaluation activities conducted by NSF program staff consistent with the terms and conditions of the cooperative agreement.

PROPOSAL PREPARATION & SUBMISSION INFORMATION

Letters of Intent: None

Preproposal Requirement: None

A. Proposal Preparation Instructions

A responsive and/or competitive proposal must demonstrate explicitly the urban district's K-12 plan for reform that builds on the existing reform infrastructure. **Thus, the project description of the USP proposals must contain the following elements:**

1. Overview

This brief section should describe the need for the USP in the specific locale, and what the proposer plans to accomplish. **It is not necessary to review the general state of affairs for underserved populations in urban districts.** It should also provide a brief description bearing on the school system, its strengths and weakness, and characterize the physical, social, cultural, political, and intellectual environments in which the USP will operate.

2. Planning History

This section should briefly describe the process and results of planning by which the districts and selected partners developed a shared vision for establishing the reform agenda for the re-

spective K-12 system inclusive of the two-or-four-year option with institutions of higher education. This planning phase should identify key participants, committees and other working groups established; highlight milestones, obstacles, kinds and scope of data used to inform decisions; and describe other emerging echanisms to help achieve program goals. Included in this section should also be information relative to exemplary local, state, regional, and national programs that might be useful to the efforts being proposed and characteristics of systems that have made significant progress towards systemic reform.

3. Goals, Objectives and Benchmarks

This section should address both short-term and long-range goals and objectives. Benchmarks (baselines) should be established to guide the implementation process over the course of the funding period per the option selected. Should the ultimate goals require more than the baseline for completion, proposers must develop interim goals to help determine whether the program is progressing successfully towards the achievement of specific goals and objectives. **Each urban school district is required to include a minimum set of baseline data and performance benchmarks that will allow it to determine the origination point and to assess progress towards achievement of its goals and objectives.** This baseline data should include the most recent student achievement in mathematics and science at all grades tested by the state/district. The baseline data should be summarized on no more than five pages and included in the appendix with specific references in the narrative of the proposal.

4. The Core K-12 Program

This section should address the specific goals of the reform program that bears on the component of the K-12 science and mathematics that will likely lead to full-scale implementation of a high quality science and mathematics program for all students. Careful consideration must be given to and evidence provided to demonstrate how support through this program would facilitate full-scale implementation. For example, an urban district may have completed its infrastructure but may not have reached the level of capacity and competency in its instructional workforce to ensure full delivery of the standards-based curriculum. Thus, funding from NSF would be used to augment existing state, district, and other federal funds devoted to the needed activities. Another system may have completed its infrastructure but may need assistance in the infusion of technology into the teaching and learning of science and mathematics, while another may need assistance in enhancing the diversity and number of teachers and skilled entrants in the science and mathematics instructional and technological workforce.

The integration of a two-and-four-year option into the K-12 program must be seamless and add intrinsic value that will directly impact all students at the classroom level. Specific details for the inclusion of such components must explicate how such activities will lead to the districts' expected outcomes. Should graduate students or post doctoral personnel be included as crucial to the achievement of reform efforts, their roles and responsibilities (and associated costs) must be clearly delineated.

5. Implementation Process

It is important that proposers consider a variety of organizations, schedules, activities, and approaches that will support, nurture, and sustain new delivery systems. Examples might include the use of technology, staggered work hours, differentiated staffing, special school release time, before and after school extended day program, summer, and academic-year enrichment programs, and community service and transition programs. Special attention should be given to the reallocation of teaching resources to ensure maximum student-teacher interactions.

6. Program Management and Staffing

All proposals must be submitted by the office of the superintendent or other official who is designated as the chief school officer. Persons that have an active role in policy and budgetary decisions, the implementation, monitoring, and evaluation of program activities, and the assessment of student achievement must have direct access to the superintendent. It is understood that program-staffing requirements will depend on the design, scope, and discipline focus; however, staffing should include district and school administrators, teaching, and counseling personnel and faculty from local institutions of higher education. The proposal also should include plans, endorsed by the office of the superintendent or chief school officer, to continue program activities after NSF funding has ended and certification that the NSF funds will not replace extant financial resources devoted to mathematics and science education.

Submitting school districts must also comply with the 1998 Drug-Free Workplace Act and the Federal Conflict-of-Interest requirement (NSF Form 1371).

7. Advisory Committee

The establishment of an advisory committee is desirable to assist a district in the implementation and assessment of program activities. Should the district elect to organize an advisory committee, there should be adequate representation from all groups that have responsibility for the design and implementation of the educational program in the system. This could include teachers and school system administrators, leaders of parent and community-based educational organizations, practicing engineers and scientists, representatives from local business and industry, and institutions of higher education, especially science and mathematics educators. Prospective candidates for the committee must be identified in the proposal. The superintendent or chief school officer must be a member of this committee.

8. Assessment/Accountability

A detailed plan for collecting, processing, and using appropriate disaggregated data to establish a baseline and assess student progress is critical to the success of a USP. This should include the means by which the system documents, measures, and re-

ports on the system's resources, allocations, programs, policies, procedures, and measurable outcomes as they bear on accountability for science, mathematics, and technology education.

B. Proposal Submission

Proposals submitted to NSF must be prepared and submitted in accordance with the guidelines provided in this program solicitation and the general NSF guidelines provided in the current edition of Grant Proposal Guide (GPG), NSF 99-2 (October 1998). **Proposers should note that the new edition of GPG includes significant changes in procedures from previous editions**. Copies of this Guide (NSF 99-2) or the Proposal Forms Kit (NSF 99-3) which is contained as part of NSF 99-2 are available electronically on the NSF Web site at: http://www.nsf.gov/egi-bin/getpub?gpg in a variety of formats including: HTML, Microsoft Word, ASCII text, and Portable Document Format (PDF). Paper copies of the GPG can be requested at no cost from:

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All proposals described in this document must contain the following sections as described fully in the GPG:

- Information about the principal investigator (s) and program director (s). For paper submissions, one copy only of NSF Form 1225 must be attached to the signature copy of the cover sheet.
- A two-page cover sheet (NSF Form 1207). The NSF organizational unit is Urban Systemic Program."
- Program Summary. It should not exceed 200 words and should be placed on a separate page. The heading should include the name of the program, the name of the urban and the congressional district, the submitting organization, and the name, address, and telephone number of the principal investigator.
- Table of Contents. Begin numbering pages with "1" and continue sequentially, including proposals submitted through FastLane (See Section E for more information on FastLane). Blank out the printed numbers on the pages copied from the GPG and insert numbers appropriate to your sequence. Continue sequential numbering through Appendices.
- Project Description. The Project description must not exceed **15 single spaced** (30 double spaced pages are not acceptable). Proposals exceeding the page limitation will not be considered.
- The proposal must be prepared using a typewriter or letter quality printer with a typeface or font giving no more than 12 characters per inch. Each copy of the proposal should be on standard size paper with 2.5-cm margins, and stapled only in the upper left comer. All pages must be numbered. All material submitted to the Foundation must be contained in a single package. Secure packaging is essential. The Foundation is not responsible for the processing of proposals damaged in transit. The program acronym (USP) must be clearly listed on the mailing label and on the cover sheet. Proposers are strongly encouraged to contact a USP program officer prior to submission of the proposal.
- A timeline for program activities should be included in the appendices.
- A brief (no more than two pages) bibliography of pertinent literature.
- A biographical sketch for each senior personnel involved as principal investigators, principal co-investigators, or program director (s), or having a major administrative, instructional, or consulting responsibility to the program. Individual vitae must not **exceed two pages** and should include a list of up to five publications most closely related to the proposed program.
- List of collaborators within the past 48 months should be included in the appendices.
- Budget Form 1030. This must be provided for each annual budget and for the cumulative budget for all years of the program. Identify each year's request (e.g., first, second, etc, and cumulative budget.) in the margin at the top right of the form AND on the bottom center of the form. **A complete Form 1030 is required for each proposed subaward**. The proposed principal investigator for the subaward and an authorized organizational representative must sign the form.
- Brief Budget Justification Pages that provide detailed clarifying information for the funds requested on each line of NSF Budget Form 1030. Detailed explanation should also be provided for the funds requested for each subaward proposed as a part of the budget. Since the USP requires redeployment of existing funds, a clear discussion of cost-sharing is essential in each subaward.
- Statement of Current and Pending Support (NSF Form 1239).
- Materials included in the Appendix must be held to a minimum and must not be used to circumvent the **15-page** limitation. Letters of commitment should be included in the Appendix. They must be explicit in terms of the nature of support that will be provided—its scope, duration, monetary value and the role and function of the participating organizations. The Appendix should be printed on pages of a color different from the narrative (this requirement for color pages does not apply for FastLane users). **For FastLane submissions the Appendix should be clearly labeled and included at the back of the Project Description PDF file.**

C. Budgetary Information

1. General Provisions

Proposers may request from the Foundation appropriate direct, indirect and participants' costs. Separate budgets must be pre-

pared for each year of program activities, along with cumulative five-year budget that must be included on an NSF Form 1030.

General NSF provisions of special relevance to this program as well as additional program specific regulations, are summarized below:

- Allowable costs include staff salaries; consultants, materials and supplies for classroom and laboratory activities, and teacher stipends.
- Indirect costs are allowed but will not be paid on participants' support costs. (Line F, Form 1030)
- Funds should be included for the principal investigator and program directors (up to four people) to attend at least two to three, two-day meetings in Washington, DC. Proposers should use their institutional guidelines regarding allowances or, in the absence of such policies, the rate of $168/day.

2. Cost-Sharing

The USP requires cost-sharing for all programs submitted in response to this solicitation. Cost-sharing amounts must be allowable, reasonable, and properly tracked and documented in accordance with The NSF Grant Policy Manual and the Office of Management and Budget (OMB) Circular No. A-110, *Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations.* The proposed cost-sharing will be considered in evaluating the proposal and will be a condition of an award. The amount of cost-sharing should be shown in sufficient detail to allow NSF to determine its impact on the proposed program. Documentation of availability of cost-sharing must also be included in the proposal.

Only items that would be allowable under the applicable cost principles, if charged to the program, may be included as grantee's contribution to cost-sharing. Contributions may be made from any non-Federal sources, including non-Federal grants or contracts. Contributions from non-Federal sources may be counted as cost-sharing toward Federal programs only once. Additional funds made available through Federal sources (e.g. Eisenhower Program, Title I and Title II, Perkins and other funds) should be specifically identified.

Possible areas for cost-sharing, in addition to financial resources, include staff release time, allowable participant costs, and the purchase of new materials related to program activities. The use of school buildings, equipment, and materials during normal hours of operation is not considered cost-sharing.

3. Indirect Cost Limitations: None

4. Other Budgetary Limitations

Support will not be provided for general-purpose office equipment such as furniture. Funds may be allocated for office equipment to facilitate implementation of program plans not to **exceed $20,000 over the life of the award in the K-12 component of the program**. Proposers should keep in mind that upgrading or expanding equipment is not a priority in this program. NSF will not award funds for curriculum or instructional materials for general classroom use. Support allocated for such purposes must be directly tied to professional development and other activities for teachers of mathematics and science. Funds for evaluation of USP programmatic activities are limited to $75,000 per year (first year funds should be used exclusively in preparing data gathering measures to facilitate adequate and accurate evaluation of programmatic activities). Moreover, travel funds will be generally limited to 1% of the total award and may not be used to attend general conferences or other professional development activities. This includes conferences at which an individual reports on USP activities.

5. *Other Budgetary Information*

a) Authorized Organizational Representative

Submitting school urban districts must have a fiscal agent who serves as the authorized organizational representative (AOR). The AOR is the administrative official who on behalf of the proposing school district is empowered to make certifications and assurances and can commit the school district to the conduct of a program that NSF is being asked to support as well as adhere to various NSF policies and cooperative agreement requirements. The AOR must sign both the NSF Form 1207 and Form 1030 where indicated. Should there be questions regarding this issue, school districts should contact the Foundation's Division of Grants and Agreements.

b) Subawards

All subawards must be monitored by the submitting school district in accordance with applicable federal cost principles and administrative requirements. Subawards can only be issued to organizations that have fiscal authority and responsibility to account for and handle funds. The receiving organization(s) shall be subject to program audits and fiscal audits. The school district must develop and implement a plan that will ensure close monitoring of all subawards. Should there be questions regarding this issue, school districts should contact the Foundation's Division of Grants and Agreement.

c) Documentation of Level of Effort

School districts must maintain personnel activity reports that show each employee's activity or type of work on their job as related to the USP. OMB Circular A-87, *Cost Principles for State and Local Governments,* states that personnel activity reports reflecting each employee's distribution of activity are required for employees whose compensation is charged to federal awards, and that these activity reports must reflect an after-the-fact distribution of each employee's actual activity. School districts must maintain personnel activity reports so as to decrease the possibility of salaries being incorrectly charged to an award. Should there be questions regarding this issue, school districts should contact the Foundation's Division of Grants and Agreement.

6. Budget Explanations

Using the same categories as those listed on the budget Form 1030, a rationale for the level of NSF support requested for each budget item should be provided. In separate columns, using the same categories, level of support (monetary and in-kind) should be listed that come from the school system and from other sources in direct support of program activities.

D. Proposal Due Dates

For paper submission of proposals, the delivery address must clearly identify the NSF announcement or solicitation number under which the proposal is being submitted. Fifteen (15) copies of the proposal, including one copy with original signatures MUST be received by 5:00 PM, ET, March 31, annually. Proposals should be mailed to:

Solicitation No. 99-52 (USP)
Proposal Processing Unit
National Science Foundation
4201 Wilson Blvd.
Arlington, VA 22230

One additional copy should be sent to the attention of a Program Director, Urban Systemic Program (USP), at the address given below.

Division of Educational System Reform—Urban Systemic Program
National Science Foundation
4201 Wilson Blvd., Rm. 875
Arlington, VA 22230
(703) 306-1684; FAX (703) 306-0456

For electronic submission of proposals, the proposals MUST be submitted by 5:00 PM, local time, March 31, annually. Copies of the signed proposal cover sheet must be submitted in accordance with the instruction below.

Submission of Signed Cover Sheets. For proposals submitted electronically via the NSF FastLane Project, the signed proposal Cover Sheet (NSF Form 1207) should be forwarded to the following address and received by NSF by April 8, annually.

National Science Foundation
DIS-FastLane Cover Sheet
4201 Wilson Blvd.
Arlington, VA 22230

A proposal may not be processed until the complete proposal (including signed Cover Sheet) has been received by NSF.

E. FastLane Requirements

The NSF FastLane system is available for electronic preparation and submission of a proposal through the WEB at FastLane Web site at ‹ http://www.fastlane.nsf.gov›. The Sponsored Research Office (SRO or equivalent) must provide a FastLane Personal Identification Number (PIN) to each Principal Investigator (PI) to gain access to the FastLane "Proposal Preparation" application. PIs that have not submitted a proposal to NSF in the past must contact their SRO to be added to the NSF database. This should be done as soon as the decision to prepare a proposal is made.

In order to use NSF FastLane to prepare and submit a proposal, the following are required:

Browser (must support multiple buttons and file upload)

- Netscape 3.0 or greater
- Microsoft Internet Explorer 4.01or greater

PDF Reader (needed to view/print forms)

- Adobe Reader 3.0 or greater

PDF Generator (needed to create project description)

- Adobe Acrobat 3.01 or greater
- Aladdin Ghostscript 5.10 or greater

A list of registered institutions and the FastLane registration form are located on the FastLane Web page.

PROPOSAL REVIEW INFORMATION

Proposals received under this solicitation will be reviewed following the general procedures:

A. Merit Review Criteria

Reviews of proposals submitted to NSF are solicited from three or more peers with expertise in the substantive area of the proposed research or education project. NSF invites the proposer at the time of submission, to suggest names of appropriate or inappropriate reviewers. Special care is taken to ensure that reviewers have no immediate and obvious conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority serving institutions, adjacent disciplines to that principally addressed in the proposal, etc. These suggestions may serve as one source in the reviewers selection process at the Program Officer's' discretion. Program Officers may obtain comments from assembled review panels or from site visits before recommending final action on proposals. Recommendations for awards are further reviewed by senior staff.

Proposals will be reviewed against the following general merit review criteria established by the National Science Board. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she is qualified to make judgements.

1. What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on

the quality of prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

2. What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g. gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. Those institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learner perspectives. PIs should address this issue in their proposals to provide reviewers with the information necessary to respond fully to both of the NSF merit review criteria. NSF staff will give careful consideration in making funding decisions.

Integrating Diversity into NSF Programs, Projects and Activities

Broadening opportunities and enabling the participation of all citizens - women and men, underrepresented minorities, and persons with disabilities - is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports. All PIs should address this issue in their proposals to provide reviewers with the information necessary to respond fully to both of the NSF merit review criteria. NSF staff will give it careful consideration in making funding decisions.

B. Additional Review Criteria

In addition, to the general NSF review criteria, reviewers will also be asked to review USP proposals on the basis of the following criteria:

1. **Intrinsic Merit**. This criterion is used to assess the likelihood that the program will lead to systemic changes having substantial impact on science, mathematics, and technology education for all students within the subject urban school district. It should speak specifically to the following key elements:

   NEED: Are the important needs, problems, and issues reflected in an effective comprehensive planning process?

   RATIONALE: To what extent does the proposal convey an understanding of the status of the educational infrastructure in the urban school district and of the elements involved in effecting systemic change? Is NSF support necessary and clearly justified?

   VISION: Is there a clear sense of what the USP expects to accomplish? Is a unified set of concepts, beliefs, and goals regarding science, mathematics, and technology education clearly articulated? Does this vision form the basis of the proposal? Are the proposed changes aligned with relevant state and local standards?

   SCIENTIFIC AND EDUCATIONAL MERIT: Has the proposer benefited from the best thinking of the mathematics, science, technology, and educational policy communities? Are the proposers knowledgeable about other related efforts at the urban, state, and national levels? Are "proven" approaches to increasing the participation and achievement of underrepresented groups (i.e. minorities, women, and persons with disabilities) in mathematics, science and technology education programs included within the proposal? Have lessons learned from NSF prior efforts been incorporated into program plans?

   INSTITUTIONALIZATION: How will the changes proposed become part of the system? What will they replace? How will the changes be institutionalized? Will the program encourage and facilitate improved and lasting working relationships among the various partners.

2. **Performance Competence**. This criterion relates to the capability of the proposers, the soundness of the approaches, and the adequacy of the resources available to carry out the USP.

   STAFFING: Is the proposed staff, especially the program director(s) and other key personnel, qualified to lead this program? Do they include, and/or have access to, the urban and school district leadership and other key policy makers? Are staff and time allocations sufficient to do the job? Are scientists, mathematicians, engineers as well as educators in these disciplines an integral part of the team?

   PLAN: Have the proposers developed a plan of operation that will lead to the specified changes? Have they developed a workable management plan with appropriate timelines? Does the school district have the capability to carry out the program? Are proposed subawards necessary and have the proposers developed a plan for administering them?

   DOCUMENTATION AND EVALUATION: Have the proposers developed a workable documentation and evaluation plan? Have they identified both short- and long-term impacts they seek from the changes they propose? How will the impacts be evaluated? Are criteria for success, benchmarks, clearly stated in measurable terms? Is there a

process for responding effectively and efficiently to the identified problems? Is formative and summative evaluation provided for? Is there a mechanism to monitor student performance/achievement, K-16? Has an appropriate database been established? Is the expertise available to implement it?

BUDGET: Are budgets related to the activities to be carried out? Are the program costs appropriate to achieve program outcomes? Does the budget explanation (further clarify the Budget Summary Form 1030) present detailed justifications, including details of cost-sharing, for each program partner? Have they indicated how resources will be coordinated or developed to achieve the program's goals?

3. **Utility or Relevance of the Program**. This criterion is used to assess the likelihood that the school district's approach will lead to the kind of reform necessary to improve the education of all urban youth in mathematics, science, and technology. Will the initiative result in implementation of quality products (e.g., educated students able to enter the workforce and availability of a sufficiently high level of appropriate courses, professional development strategies, student intervention programs, parent involvement models, new governance structures, and assessment programs)? Will they be institutionalized? Will others be able to adapt the approaches?

4. **Effect on the infrastructure of science and engineering**. This criterion relates to the potential of the program to contribute to lasting improvements in the SMET educational system that result in significantly altering the life patterns of students and the productivity of the national educational enterprise vis-a-vis minorities, women and students with disabilities.

The NSF staff may solicit further information through site visits, and other means necessary to gather information about a proposal. Other factors that will be considered by staff in selecting the awardees from within substantially similar quality groupings include: (1) the amount and duration of cost-sharing and the degrees of certainty that the proposed levels can be delivered; (2) the firmness and substance of the commitments from the participating entities, groups, and individuals; and (3) the degree to which the proposed initiative is responsive, original and innovative.

C. Merit Review Process and Associated Customer Service Standard

Most of the proposals submitted to NSF are reviewed by mail review, panel review, or some combination of mail and panel review. Proposals submitted in response to this announcement will be reviewed by the combination previously mentioned.

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Reviewers will be asked to formulate a recommendation to either support or decline each proposal. A Program Officer assigned to the proposal's review will consider the advice of reviewers and will formulate a recommendation. In most cases, proposers will be contacted by the Program Officer after his or her recommendation to award or decline funding has been approved by his or her supervisor, the division director. This informal notification is not a guarantee of an eventual award. NSF will be able to tell applicants whether their proposal have been declined or recommended for funding within six months for 95 percent of proposals in this category. In those cases where a proposal is being considered for joint funding by separate divisions, directorates, or agencies, NSF will be able to tell applicants within nine months in 95 percent of proposals. The time interval begins on the proposal deadline or target date or from the date of receipt, if deadlines or target dates are not used by the program. The interval ends when the division director accepts the program officer's recommendation.

In all cases, after final programmatic approval has been obtained, the recommendation then goes to the Division of Grants and Agreements for review of business, financial and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants Officer may make commitments, obligations, or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with an NSF Program Officer. A principal investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants Officers does so at its own risk.

AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made ***to the submitting organization*** by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administrating the program. Verbatim copies of reviews, not including the identify of the reviewers, will be provided automatically to the Principal Investigator.

B. Award Conditions

Cooperative agreement awards are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, (NSF 95-26) available electronically on the NSF Web site. The GPM also is available in paper copy by subscription from the Superintendent of Documents, Government Printing Office, Washington DC 20402. The GPM may be ordered through the GPO Web site at: <http://www.gpo.gov>.

C. Reporting Requirements

For all multi-year awards, the PI must submit an annual report to the cognizant program officer at least 90 days before the end of the current budget period.

Within 90 days after expiration of an award, the PI is also required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. Therefore, PIs should examine the format of the required reports in advance to assure availability of required data.

NSF has implemented a new electronic project report system, available through FastLane, which permits electronic submission and updating of project reports, including information on: project participants (individual and organizational); activities and findings; publications; and, other specific products and contributions. Reports will continue to be required annually and after the expiration of the award, but PIs will not need to re-enter information previously provided, either with the proposal or in earlier updates using the electronic system.

Effective October 1, 1998, PIs are required to use the new reporting format for annual and final project reports. PIs are strongly encouraged to submit reports electronically via FastLane. For those PIs who cannot use FastLane, paper copies of the new report formats may be obtained from the NSF Clearinghouse as specified above. NSF expects to require electronic submission of all annual reports and final reports via FastLane beginning October 1999.

D. New Awardee Information

If the submitting organization has never received an NSF award, it is recommended that the organization's appropriate administrative officials become familiar with the policies and procedures in the NSF *Grant Policy Manual* which are applicable to most NSF awards. The "Prospective New Awardee Guide" (NSF 97-100) includes information on: Administration and Management Information: Accounting System Requirements and Auditing Information; and Payments to Organizations with Awards. This information will assist an organization in preparing documents that NSF requires to conduct administrative and financial reviews of an organization. The guide also serves as a means of highlighting the accountability requirements associated with Federal awards. This document is available electronically on NSF's Web site at: <http://www.nsf.gov/cgi-bin/getpub?nsf97100>.

CONTACTS FOR ADDITIONAL INFORMATION

General inquiries should be made to the **Urban Systemic Program**, Celeste Pea, Program Officer, Room 875, Division of Educational System Reform, National Science Foundation, Arlington, VA 22230, telephone 703-306-1684, e-mail: cpea@nsf.gov. For questions related to use of FastLane, contact, Carolyn Miller, FastLane Project Officer 703-306-1145 x4659, e-mail: cmiller@nsf.gov.

OTHER PROGRAMS OF INTEREST

The NSF Guide to Programs is a compilation of funding opportunities for research and education in science, mathematics, and engineering. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter. Beginning in fiscal year 1999, the NSF Guide to Programs only will be available electronically. Many NSF programs offer announcements concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices listed in Appendix A of the GPG.

For a list of current deadlines and target dates for the submission of proposals, refer to the E-Bulletin, located on the NSF Home Page. The direct URL for the E-Bulletin is <http://www.nsf.gov/home/ebulletin/>. Subscribers can also sign up for NSF's Custom News Service to find out what funding opportunities are available.

ABOUT THE NATIONAL SCIENCE FOUNDATION

NSF funds research and education in most fields of science and engineering. Grantees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals on behalf of all qualified scientists, engineers, and educators. The foundation strongly encourages women, minorities, and persons with disabilities to participate fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (some programs may have special requirements that limit eligibility).

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement or contact the program coordinator at (703) 306-1636.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 306-0090, FIRS at 1-800-877-8339. The catalog of Federal Domestic Assistance Number is 47.076, Education and Human Resources.

APPENDIX

Requirement for Baseline Data

Each urban school district is required to include a minimum set of baseline data on the most recent student achievement in mathematics and science at all grades tested by the state/district. The baseline data should be reported on three to five pages and should be included in the appendix with specific references in the narrative of the proposal.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposals forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch of Congress. This information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers, and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF 50, "Principal Investigators/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of your receiving an award.

The public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to:

Reports Clearance Officer
Information Dissemination Branch
Division of Administrative Services
National Science Foundation
Arlington, VA 22230

YEAR 2000 REMINDER

In accordance with Important Notice NO.120 dated June 27, 1997, Subject: Year 2000 Computer Problem, NSF Awardees are reminded of their responsibility to take appropriate actions to ensure that the NSF activity being supported is not adversely affected by the Year 2000 problem. Potentially affected items include: computer systems, databases, and equipment. The National Science Foundation should be notified if an awardee concludes that the Year 2000 will have a significant impact on its ability to carry out an NSF funded activity. Information concerning Year 2000 activities can be found on the NSF Web site at: http://www.nsf.gov/oirm/y2k/start.htm.

This program is described in the Catalog of Federal Domestic Assistance category 47.076, EHR.

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